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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to the discharge lamp used for the object for manuscript lighting used for information machines and equipment, such as a facsimile, a copying machine, and an image reader, an electrical scoreboard, a large sized display device, etc.

[0002]

[Description of the Prior Art]In recent years, the fluorescent lamp is used as a light source for manuscript lighting of information machines and equipment, such as a facsimile, a copying machine, and an image reader. For these uses, it is called for more from the lamp that it is long lasting and small size, high-intensity, and reliable. Since the conventional fluorescent lamp has a filament electrode inside the pipe, its restrictions on the structure by an electrode are large, and various trials are made in order to solve these problems.

[0003]In [ drawing 8 (a) and (b) is a sectional view showing the conventional discharge lamp shown in the collection of the 75th anniversary national conference drafts of the Illuminating Engineering Institute of Japan foundation in the Heisei 3 fiscal year, for example, and ] a figure, The glass bulb of the cylindrical shape as a discharge container in which 1 enclosed with the inside the rare gas which made xenon gas the subject, The surface state electrode by which 3a and 3b were provided in the shaft orientations of the outer surface of the glass bulb 1, the fluorescent substance layer by which 4 was formed in the inner surface of the glass bulb 1, and 5 are the optical power parts which irradiate with the light generated within the glass bulb 1 out of the glass bulb 1, This discharge lamp is connected to the electrode 3a and the power supply 7 which supplies voltage among 3b by the leads 6a and 6b.

[0004]If voltage is impressed from the power supply 7 among the exterior electrodes 3a and 3b, current will flow with inter-electrode electric capacity, and it will discharge. By this

discharge, ultraviolet rays occur in the glass bulb 1, and these ultraviolet rays excite the fluorescent substance layer 4 formed in the inner surface of the glass bulb 1, and generate visible light.

[0005]

[Problem(s) to be Solved by the Invention]Since it had become the composition of providing a surface state electrode on the peripheral face of the discharge container which glass broke easily and enclosed only rare gas in the above-mentioned conventional discharge lamp, when manufacturing, it is troublesome and the maintenance of discharge container exchange etc. also had problems, like a surface state electrode is on a peripheral face, and it is troublesome and is.

[0006]It was made in order that this invention might solve the above problems, and manufacture and a maintenance become easy, and, thereby, cost is also aimed at obtaining the discharge lamp which becomes low.

[0007]

[Means for Solving the Problem]A discharge lamp concerning this invention encloses a medium for discharge with an inside of a discharge container, it is provided in contact with a discharge container outside surface so that discharge space inside the above-mentioned discharge container may be excited to an inner surface of a discharge container supporter holding this discharge container, and it is provided with two or more surface state electrodes to which predetermined voltage is impressed.

[0008]They provide at least one internal electrode, and other inventions are provided so that an inner surface of a discharge container supporter holding this discharge container may be touched on the above-mentioned discharge container outside surface, and are provided with two or more surface state electrodes to which predetermined voltage is impressed from the outside while they enclose a medium for discharge with an inside of a discharge container.

[0009]Other inventions provide an insulator layer in the above-mentioned surface state electrode surface.

[0010]

[Function]A discharge container supporter makes discharge cause inside a discharge container in the discharge lamp constituted like claim 1 from impressing voltage to the surface state inter-electrode provided in the inside while holding a discharge container.

[0011]A discharge container supporter makes discharge cause inside a discharge container in the discharge lamp constituted like claim 2 from impressing voltage between the surface state electrode provided in the inside, and the internal electrode in a discharge container while holding a discharge container.

[0012]In the discharge lamp constituted like claim 3, although the surface state electrode is covered with the insulator layer, discharge is made to cause inside a discharge container, and

an insulator layer carries out electric shock prevention and a water proof operation.

[0013]

[Example]

Below example 1. describes one example of this invention. Drawing 1, and 2 and 3 show the discharge lamp of the structure by this invention, and drawing 1 is the general drawing which equipped the discharge container supporter with the lamp, drawing 2 is each lineblock diagram before wearing of a discharge container supporter and a discharge container, and drawing 3 is a sectional view of this discharge container. The discharge container supporter formed with the plastic hard [ one / in a figure ] in a glass bulb and 2, and 3a and 3b show the surface state electrode provided inside the discharge container supporter (side which touches a glass bulb). Except for a width of several millimeters, the fluorescent substance layer 4 is formed in the wall of the glass bulb 1 covering the overall length. Furthermore inside the glass bulb 1, 70Torr enclosure of the xenon gas is carried out. The portion in which the fluorescent substance layer 4 of the glass bulb 1 is not formed serves as the optical power part 5 which irradiates with the light generated within the discharge container out of a glass bulb. 6a is connected to the electrode 3a, and 6b shows the lead connected to the electrode 3b, and is connected to the 20-kHz high-frequency ac power supply 7, respectively.

[0014]The operation about the discharge lamp of such composition is explained. Voltage is impressed to each electrodes 3a and 3b from the high-frequency ac power supply 7, it is touched, or voltage is supplied to the xenon gas in the glass bulb 1 via the glass which is a \*\*\*\*\* dielectric, and discharge occurs. The ultraviolet rays generated in this discharge excite the fluorescent substance 4 formed in the wall of the glass bulb 1, emit visible light with wavelength peculiar to that fluorescent substance 4, and output visible light from the optical power part 5.

[0015]Hereafter, the principle of luminescence is explained in detail. Since discharge is performed via the glass which is a dielectric, current is restricted by the dielectric and this discharge lamp does not develop into the gestalt of arc discharge from glow discharge. Discharge does not concentrate on a specific place but discharge occurs from the whole glass bulb inner surface corresponding to exterior electrodes. Since the current density in the glass bulb inner surface which faced exterior electrodes will become uniform if the thickness of glass, etc. are constant and the characteristic as a dielectric is uniform, the density of the ultraviolet rays to generate also becomes about 1 appearance, and generating of visible light also becomes about 1 appearance. For this reason, the luminance distribution of a ramp surface becomes almost uniform. Current stops current by accumulating an electric charge in a glass bulb inner surface a flow and except [ its ], only immediately after the polarity of the impressed voltage is reversed. For this reason, the current on a pulse flows into a lamp.

[0016]If an internal discharge state is observed in detail, the whole lamp inner surface which

faced exterior electrodes will be covered with light [ like ] about one, and many thin filar discharge which connects between the electrodes which met further is seen generated by about 1 fixed interval in the shape of stripes. When rare gas like a xenon is enclosed with an inside, a rare gas atom is first excited by such discharge by the collision with an electron to a resonance level. Since the excited atom of this resonance level has the high pressure of rare gas, it causes the rare gas atom of other ground levels, and a collision, and forms the excimer of a diatomic molecule. This excimer emits ultraviolet rays and returns to the rare gas atom of two ground levels.

[0017]The most reaches the wall of a lamp and the ultraviolet rays which the excimer emitted are changed into visible light by the fluorescent substance in order not to cause a self-absorption like atomic resonance ultraviolet rays. That is, in luminescence by an excimer, a brighter light is obtained. When a xenon is used as rare gas, with the glow discharge type lamp which provided the electrode in the inside, the ultraviolet rays which about 172-nm excimer emits with this discharge lamp to a thing with many resonance ultraviolet rays of a 147-nm xenon are subjects. The wavelength of ultraviolet rays has been advantageous also in respect of the luminous efficiency of a fluorescent substance, or degradation for a long time.

[0018]Thus, if the surface state electrodes 3a and 3b are formed in the socket which is a discharge container supporter and it equips with the glass bulb 1, the surface state electrodes 3a and 3b inside the glass bulb 1 and the discharge container supporter 2 will touch, and electric capacity will be formed. Therefore, the discharge lamp of such a structure can also be discharged. And by using structure of providing a surface state electrode inside the discharge container supporter 2 which is easy to deal with it rather than providing a surface state electrode in the peripheral face of the glass bulb 1 in which rare gas was enclosed in this way and which breaks easily, manufacture and a maintenance are easy and cost becomes low.

[0019]Example 2. drawing 4 shows the example in the discharge lamp which provided the internal electrode. As shown in drawing 4, the internal electrode 10 is formed in the glass bulb 1, and the above-mentioned surface state electrode 3 is formed inside a discharge container supporter (side which touches the glass bulb 1). As for the glass bulb 1, except for a width of several millimeters, a fluorescent substance layer is formed in the wall covering the overall length like Example 1, and 70Torr enclosure of the xenon gas is further carried out inside. The portion in which the fluorescent substance layer of the glass bulb 1 is not formed serves as an optical power part which irradiates with the light generated within the glass bulb 1 out of a glass bulb.

[0020]Also in this example, if the high-frequency ac voltage of 20 kHz is impressed to the internal electrode 10 and the exterior electrodes 3b from the high-frequency ac power supply 7, discharge will arise, the same operation as the above-mentioned Example 1 is carried out, and it emits optical power.

[0021]Example 3. drawing 5 is a sectional view showing the example of the invention which has improved the above-mentioned Example 1. This example is covered with the insulator layer 9 with a thin surface top of the electrodes 3a and 3b provided in the discharge container supporter 2 like drawing 5.

[0022]Discharge is possible even if this kind of discharge lamp is covered with the insulator layer 9 with a thin surface top of the electrodes 3a and 3b. It can discharge, even if an interval arises somewhat, without the surface state electrodes 3a and 3b sticking to the glass which is a dielectric thoroughly. And since the surface top of the surface state electrodes 3a and 3b is covered with the insulator layer 9, there are safety and a waterproof effect, and it is usable also outdoors.

[0023]example 4. drawing 6 -- the direction of an inner shaft of the discharge container supporter 2 -- two or more pairs of electrodes 3a-3f -- \*\*\*\*\* -- it arranges like and the each switches 8a-8c are formed on each lead to which this two or more pairs of electrodes 3a-3f and power supply 7 are connected. By stopping the request switch of these switches 8a-8c, only the electrode section to which voltage was impressed is discharged and emits light. Example 1 -- the same -- the peripheral face of the glass bulb 1 -- not but -- taking two or more electrode pairs inside the discharge container supporter 2 -- \*\*\*\*\* -- manufacture becomes easy by things.

[0024]As for example 5. drawing 7, it is possible to make only a required place turn on by making the discharge container supporter 2 slide to right and left on the glass bulb 1, without fixing to the glass bulb 1 in the case of the discharge lamp which attached the discharge container supporter 2 shorter than the glass bulb 1 to shaft orientations. Although details are omitted in this figure, it is the same as that of Example 1 that the surface state electrode is provided in the composition of the glass bulb 1 and the inner surface of the discharge container supporter 2.

[0025]

[Effect of the Invention]According to the invention by claim 1 statement, manufacture and discharge container exchange become easy by having composition of providing an electrode inside a discharge container supporter (side which touches a discharge container) rather than providing an electrode on the peripheral face of a discharge container.

[0026]According to the invention by claim 2 statement, manufacture and discharge container exchange become easy by having composition of providing an electrode inside a discharge container supporter (side which touches a discharge container) rather than providing an electrode on the peripheral face of the discharge container which provided at least one internal electrode.

[0027]According to the invention by claim 3 statement, safety and a waterproof effect increase by providing an insulator layer in a surface state electrode surface.

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[Translation done.]